Issue Briefing Paper

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Title: WILL GASOHOL HELP POWER AMERICA?

THE BACKGROUND

Pro-gasohol people see alcohol made from grain and other agricultural materials as part of the solution to ever-rising petroleum prices, the nation's dependence on foreign crude oil and the apparent need to shift more oil to homes and businesses in winter.

Gasohol causes other people to get up-tight. They fear the huge volumes of grain to produce the alcohol used to make gasohol might cause skyrockting food prices at home.

Some fear using grain for gasohol would take a lot of grain off the export market, where it earns money for the U.S. from other countries. Many feel if this were done, it could mean bad news--perhaps starvation--for people in other nations who look to America for food.

Others fear bringing millions of acres of now idle and marginally productive land under tillage to grow grain for alcohol could worsen soil erosion.

Can alcohol fuels help reduce our dependence on petroleum fuels?

While the potential for alcohol fuels is substantial, what realistic level of production and use can we expect? What will it cost the nation to produce more alcohol fuels?

Two basic types of alcohol fuels exist. One is ethanol, made from agricultural crops or residues. The other is methanol, made from coal, wood or any organic material.

When ethanol is mixed with unleaded gasoline to make gasohol, it raises the unleaded fuel's octane rating.

Gasohol's predominant blend is 10 percent alcohol and 90 percent unleaded gasoline refined from crude oil. Scientists believe research and technology can boost the percent of alcohol used in the blend.

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Methanol is expected to play a bigger role in the long run--if engines are adapted to use pure methanol or some mixture of methanol and gasoline.

Both fuels can contribute to U.S. energy resources by using domestic, renewable resources and coal. Ethanol is the only alternative fuel commercially available so far and it is likely to be the only one available in quantity before 1985. Methanol could be produced in large amounts in the mid-to-late 1980's, provided industry starts building plants now.

GASOHOL ISN'T NEW

Farmers knew they could grow motor fuels long before the coming of the auto assembly line. So did Henry Ford. He built his Model T to run on gasoline, alcohol or any mixture in between.

During the depression, farmers often raised more corn than they could eat, feed to livestock or haul to markets in distant towns and cities. By fermenting the grain to get alcohol and feed, they found new ways to use their crops.

Some burned the stuff in their "Tin Lizzies," trimming the gas bill at a time when a dollar was hard to come by.

On the whole, though, while the Model T itself was a smash hit, gasohol was scarcely noticed. Gasoline was cheaper and easier to get. There were no lines at the fuel pumps. People saw little reason to put alcohol in their tanks.

Today, America is long on cars and short on fuel. Fuel crunches have given gasohol such instant fame people talk about the fuel blend as if it were a new invention.

They want to know what they can and cannot expect from gasohol. At the same time, they want to know the human and environmental price of producing and using gasohol.

At stake is America's love affair with 114 million cars. Motorists want to keep vehicles rolling 1.2 trillion miles a year, more if possible. In 1977, this took 111 billion gallons of gas. The thirst for fuel is rising with the number of cars and miles.

Much is known about gasohol. Scientists, business leaders and public policymakers have many of the facts at hand. Opinions and interpretations of this information vary widely, influenced by concerns about the extent of public financial support, such as tax exemptions, required to get the industry underway, the private business interests and environmental considerations.

The choice of whether to manufacture gasohol has already been made. But how much do we make--and how fast? To wisely chart gasohol's future,

decision makers must weigh a number of factors.

Manufacturers make most ethanol today from corn because of its high starch content, ease of processing, abundance and its price advantage over wheat.

Measuring the cost of making gasohol is complex. Corn varies in price from place to place and time to time. A critical factor is the price received by the ethanol producer for the high protein cattle feed byproduct which pays for much of the high cost of producing gasohol.

If produced in volume, this animal feed could compete with soybean meal, perhaps forcing land out of soybean production or more soybeans onto the export market.

Ethanol production costs may vary substantially with market demand. Transportation is a major variable, too. Fuel alcohol distilleries do best when they're located close to suppliers of an inexpensive feedstock.

You already can fill your tank with gasohol at locations in at least 28 states. Mostly, these are corn-growing states where farmers sell their surplus corn at low prices. Gasohol produced in states that do not grow much corn probably would sell at a higher price.

Some corn-growing states exempt gasohol from taxes, giving the fuel a chance to compete with ordinary gasoline. In every state gasohol is exempt from federal tax at the pump.

In one year, the number of service stations selling gasohol went from a handful to well over 1,000. This indicates that gasohol can be economically feasible, given the right combination of circumstances, including heavy tax incentives.

INTO THE 1980'S

Through 1985 gasohol is expected to make modest gains. After 1985, the amount of ethanol produced will depend on decisions made within the next year or so.

Those decisions will influence the number and size of plants built. Critical factors are availability of inexpensive feedstocks, the markets for feed byproducts, new developments in technology and their impact on costs, tax incentives and the relative price of competing fuels.

To make money, a methanol plant would have to produce 20,000 to 50,000 barrels per day. Such plants could costs from $500 million to over a billion dollars each and take four to five years to build.

A FOOD/FUEL CONFLICT?

Unless special incentives encourage the use of corn or other food crops to make alcohol, there isn't likely to be a conflict between food and fuel through the 1980's. Not much corn will go into ethanol production, since plant capacity will build gradually.

Besides, ethanol can be made from almost any material that contains carbohydrates. Supplies of usable surplus waste and agricultural byproducts greatly exceed the capacity to convert them to ethanol. This will continue to be the case at least until the mid-1980's.

So the materials used to make alcohol fuels in the 1980's probably won't be foodstuffs. Mostly, they will be low cost waste materials. These residues hold important potential for the nation's gasohol production.

IF FOOD CROPS WERE USED

The growth of this market will influence individual farmers to decide if they will raise crops specifically for alcohol production. Later, however, if ethanol fuel conversion capacity exceeds levels readily sustained from wastes and byproducts or if methanol production technology should be slow to come, the federal government could encourage production of energy crops such as sweet sorghum.

If corn were the major raw material used in a national gasohol production effort, marginal idle land would be forced into production and land from other crops diverted to corn.

Much controversy continues over the effects this might have on the U.S. economy.

Some observers are certain that if a large percentage of the corn crop is used for production of alcohol it will result in higher food prices, especially among cereals, baked goods and red meats.

Consumers might be swapping one problem for another--getting fuel at the expense of higher food prices.

Depending on corn or other grain for alcohol production is risky. Grain may not always be available in large quantities. Its market is dispersed. Estimates are that no more than 5 or 6 percent of each year's grain crop would be available for gasohol.

GETTING INTO PRODUCTION

Present-day distilleries, designed for beverage rather than fuel alcohol production, use petroleum-based fuels or natural gas. They were not constructed to conserve fuel. They use more energy than is in the product they produce.

However, ethanol for fuel can be produced to yield a net gain, even when oil and gas are used. And new ethanol conversion facilities can have much greater energy efficiency than existing plants. Also, industry can design ethanol-making facilities to use coal, wood, agricultural residues, solar energy or waste heat, all more available--and in some cases less expensive--than oil and gas.

If enough plants could be built, it appears that in the mid-1980's industry could produce an upper limit of about 4.7 billion gallons of ethanol per year--310,000 barrels per day--using existing technologies.

This would require bringing most existing grain land into production and using crop surpluses as well as municipal solid waste. Such a move would be costly and would restrict options for food production.

A drawback to widespread use of gasohol is price. However, price per gallon for the fuel may become more competitive as crude oil prices rise. Fuel-grade alcohol itself sells for around $1.60 a gallon. Producers might cut costs through continuous fermentation, efficient distillation, use of advanced extracting techniques, use of low-cost waste materials, better production and feedstock collection technology and improvements in the use of byproducts.

A special niche may exist for alcohol fuel production on a scale as small as 1,000 gallons per day. This could offer opportunities to local cooperatives and individual farmers who both produce the feedstock and use the ethanol themselves.

EFFECT ON ENVIRONMENT

Provided that massive acreages of marginal land are not rushed into production to grow grains for alcohol, making alcohol fuels can help improve the environment. Existing waste materials can be recovered. Using residues such as sulfite pulping wastes and cheese whey to make alcohol eases manufacturing disposal problems.

In Wisconsin, converting cheese whey to alcohol is credited with eliminating a serious pollution problem.

Practices required to mine and transport coal for methanol production could harm the environment unless carefully controlled. However, it appears that using the coal to make methanol would damage the environment less than burning coal to make electricity.

Compared with gasoline used in the same vehicle, gasohol generally decreases hydrocarbon and carbon monoxide emissions. However, gasohol slightly increases aldehyde and evaporative emissions, both said by experts to be controllable. This means automobiles would produce a different type of air pollution--not necessarily worse--than they do now.

Ethanol now is preferred over methanol because ethanol can be used without changing the existing gasoline automobile engines. But, if the nationwide demand for alcohol fuels continues to grow, more cars may be designed to run on methanol. In the long run, methanol may be less expensive than ethanol. However, it is unlikely that methanol fuel will be widely used before the late 1980's.

As a fuel, ethanol contains about two-thirds the energy contained in gasoline. Tests conducted to date show no significant difference in mileage. Alcohol's lower energy content makes the fuel more "lean," improving the performance of a car tuned for a rich mixture.

The Environmental Protection Agency reports possible environmental problems associated with gasohol's continued use on a large scale. Widescale use of either ethanol or methanol probably would trigger a reappraisal of

environmental impacts associated with distribution and use.

WHAT USDA IS DOING

"Help produce more gasohol but don't put food supplies in peril."

That's the basic aim of several steps already being taken by the U.S. Department of Agriculture. This means lending a helping hand to conversion of agricultural residues and other wastes to alcohol. Thus, the risks of using huge amounts of such basic edibles as corn for fuel might be avoided.

Four pilot facilities designed to convert agricultural and forestry materials into energy are planned by private firms with the help of $42.7 million in department loan guarantees.

Two will help produce fuel-grade ethanol. One is to make ethanol out of cellulose materials derived from sugar cane, trying a new technology. The other will test the practicality of using energy-rich sweet sorghum as a source for ethanol.

The department is expanding its search for more sophisticated alcohol-making know-how. During fiscal 1980, department scientists will get almost $6 million for alcohol fuel research and development.

Nearly $4 million of this is earmarked for the field testing of new crop varieties suitable for making ethanol and for the discovery of more efficient ways to convert agricultural materials to ethanol. Department scientists will use another $2 million to design small-scale, on-farm technologies for producing fuel and combustible methane.

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